

Abstract

A parallel plate diode comprising metal electrodes and semiconductor materials layer contacting said metal electrodes. Two thin plate electrodes made of metal are disposed in parallel, and there is a layer of thin plate semiconductor material sandwiched between the two thin plate electrodes, the concentration of the carriers in the semiconductor material layer is 20% or less than that of the electrons in the metal. One of the metal electrodes is made so as to have a plurality of recesses from its surface into the interior on the side that faces the semiconductor coat layer, the diameter of those recesses is less than 4 micrometers. These recesses are well-shape cavities and an array of the convex portions and concave portions are staggered each other. The cross section of the well shape is circular, square or rectangle. This diode output a current and a voltage in a closed loop circuit without bias voltage or bias current.

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